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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,249	09/11/2003	James V. Candy	IL-10941	8702
<div>7590      10/02/2007</div> <div>Eddie E. Scott Assistant Laboratory Counsel Lawrence Livermore National Laboratory P.O. Box 808, L-703 Livermore, CA 94551</div>				
			<div>EXAMINER</div> <div>KISH, JAMES M</div>	
			<div>ART UNIT</div> <div>3737</div>	<div>PAPER NUMBER</div>
			<div>MAIL DATE</div> <div>10/02/2007</div>	<div>DELIVERY MODE</div> <div>PAPER</div>

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/661,249

Applicant(s)

CANDY ET AL.

Examiner

James Kish

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-8, 21-25, 41-45 and 61-65 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 9-20, 26-40, 46-60 and 66-94 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-8, 21-25, 41-45 and 61-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Allowable Subject Matter***

The indicated allowability of claims 4-8, 21-25, 41-45 and 61-65 is withdrawn in view of the newly discovered reference(s) to Kerbrat et al. (Transactions of Ultrasonics). Rejections based on the newly cited reference(s) follow.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-8, 21-25, 41-45 and 61-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fink (US Patent No. 5,092,336) in view of Kerbrat et al. (Transactions of Ultrasonics), further in view of Candy (US Patent App. 2001/0037075). Fink discloses a method and device for focusing an ultrasound beam delivered by a transducer array on a reflective target in a medium. The distribution in time and the shapes of the echo signals for obtaining reversed signals are reversed and the reversed signals are applied to the respective transducers of the array (see Abstract). The method includes illuminating a zone with an initial unfocused beam. See column 2, lines 25-34. Each time reversal of the echo enhances the ratio between the energy reflected by the target of high reflectivity and the energy reflected or scattered by local

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irregularities (column 2, lines 45-48). The device comprises a transducer array, a processing channel comprising an A/D converter, memory means and a power transmitter (column 4, lines 1-9). It is possible for the device to carry out ultrasonic hyperthermia. Also, there may be a stone reflecting a beam received from an array of illumination transducers (column 2, lines 10-17). However, Fink does not describe the decomposition of the eigen-values. Kerbrat teaches a method of decomposition of the time-reversal operator. The method can be used to enhance and separate the echo of a weak scatterer from speckle noise. Each eigen vector specifies the amplitude and phase distributions across the array that focused on its respective scatterer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate eigen analysis, as taught by Kerbrat, in the system of Fink because the eigenvalues of the time reversal operator has a one-to-one correspondence with distinct scatterers in the volume, thereby allowing focusing on specific scatterers.

Neither Fink nor Kerbrat discuss weighting the eigenvalues. Candy teaches estimating a weighting coefficient of the  $l$ -th scatterer of the plurality of scatterers. While not explicitly stated in Candy, it is taught that the eigen-value analysis of Kerbrat allows one of skill in the art to determine strengths of the scattering signals based on individual scatterers, thereby providing a means to apply weights, as taught by Candy. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate eigen analysis to provide weighting, as taught by Candy, in order to reconstruct a combined total received field of weighted individual scattered fields from estimates of each of the strongest scatterers (paragraph 30).

**Conclusion**

See PTO-892 for additional relevant Non-Patent Literature.


Also see the accompanying Abstract for "Eigenmodes of the Time Reversal Operator: A Solution to Selective Focusing in Multiple-Target Media," by Prada et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Kish whose telephone number is 571-272-5554. The examiner can normally be reached on 8:30 - 5:00 ~ Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMK

  
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